Essential *fm* Report **109**

Contents:

Each issue of Essential FM Report covers a different aspect of facilities management and we would very much welcome any ideas for topics, offers to write articles, or any general comments you might have. Please email the managing editor at the address given below.

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Bloomsbury Professional

The Sustainable Movement

A few months ago, I went to the NHS Sustainable Conference in the Brewery and was pleasantly surprised by the number of people and organisations that signed up. This to me is a clear sign that the environment and sustainability are increasingly important in FM and will continue to be so in the years to come.

There were a lot of interesting seminars, interesting people, and mind boggling products that were being demonstrated at the stands. As I was networking my way around, I actually managed to get a few people interested in producing an article for EFMR. Unfortunately, they did not all come through on their word - but we have great stuff in store none the less.

The first article presented is **The Biodiversity Index** by Professor Jeff Ollerton. This article focuses on what biodiversity is and how it can be practically measured using a scientific index. He touches on critical areas such as the loss of our heritage, legislative, economic and social drivers, the Biodiversity Index tool and the reasons why organisations should assess and manage their biodiversity.

Moving on, in `**Fixing the already broken': is it our efficiency approach?** Regular contributor Sezgin Kaya provides his views on whether people should focus on being energy efficient or instead strive towards producing more efficient energy. He has included some very interesting facts about renewable energy and the impact of savings and business strategies.

Sunil Shah has contributed **Understanding data to drive behavioural change** which is an article that tells you all about the use of smart and advanced energy meters which provide the data and you need to undertake action towards saving energy. He also touches upon whether metering really helps a business, how savings can be achieved, and engaging the customer.

Last but certainly not least is a 'product study' on **Pharmafilter** by Peter Kelly. This article covers everything that you need to know about a new piece of technology that is intended for use within a healthcare environment. Peter explains the concept, the process, the characterisation, treatment and handling of hospital waste water and some fascinating results.

We're nearing the end of the year, so that means that the next topic will be Trends and Developments. I hope to see you again then!

Kind regards

Martijn Groen, Commissioning Editor, Bernard Williams Associates Ef*m*R

The Biodiversity Index – a tool for facilities management

The term 'biodiversity' is one which is widely used in the media and the general public usually has a reasonable idea of what it means, relating it to the abundance and variety of different types of plants and animals with which we share the planet. They are also perhaps aware that biodiversity is being lost, from documentaries by presenters such as David Attenborough, or from hearing about reports such as 'The State of Nature'. Loss of biodiversity is one of the world's most pressing crises. In the UK, many of our natural habitats have declined over the last 100 years, resulting in the extinction of some 500 plants and animals in England alone.

This loss of our natural heritage is not just an issue for scientists and documentary makers. It also affects the society in which we live and work. The UK National Ecosystem Assessment report, for instance, estimated that this country's natural world is worth over £30 billion per year to our economy by providing a range of what are termed 'ecosystem services'. These include tourism, air and water quality regulation, flood regulation, carbon storage, pollination of crops, and aesthetic values. Conserving the biodiversity that supports these ecosystem services is the responsibility of all of us, not just conservation charities or government.

Businesses and organisations are becoming increasingly engaged with the environment, through various legislative, economic and social drivers. The focus has been on pollution prevention, energy efficiency and wastes and resources management. However biodiversity is now beginning to gain the attention of small, medium and larger companies and organisations, many of whom don't have the knowledge or skills to effectively manage the biodiversity on their sites. In particular, smaller companies often don't have the resources or knowledge to implement biodiversity enhancing initiatives.

With approximately 22% of UK land cover comprised of non-natural, built-up areas, any improvement in their biodiversity will have a significant positive impact. These urban and suburban areas are largely ignored in terms of their ecological value. They do however have the potential to provide a significant area of land for improvement of biodiversity by providing small patches of habitat that act as stepping stones within the wider ecological network of nature reserves and other wildlife sites.

This Biodiversity Index tool is designed to help a range of organisations manage the biodiversity on the land around their site. The tool comprises a practical method to assess plant diversity at an urban location; information on why biodiversity is important; how to report it; and how to manage it.

There are well established ecological survey methods already used by professional ecologists. These types of survey provide a detailed picture of the habitats and species present on a site and are often a requirement for processes such as development and planning.

The Biodiversity Index provides a general self-assessment tool for those wishing to manage biodiversity on their urban site but who do not feel they require a detailed ecological assessment. It does not replace existing survey methods and will not provide the level of detail of those methods but it does provide a starting point for many organisations wishing to enhance biodiversity on their sites.

Features

The Biodiversity Index provides:

- Broad scale self-assessment and monitoring of plant diversity at a site level

- Interpretation of the natural environment and presentation of information relating to the sites' habitats

- Information to help develop a formal biodiversity management process, such as a company-wide Biodiversity Action Plan

- Help in identifying a range of simple activities to benefit biodiversity that can be carried out in the work place

- Information to help measure the performance of an action plan

Why assess and manage biodiversity?

Corporate social responsibility

Organisations and businesses are increasingly expected to integrate biodiversity into their CSR strategies. Employees, customers and communities are all stakeholders in the natural environment and therefore organisations that engage with biodiversity issues appeal to a broader spectrum of people.

Environmental management systems

Many businesses and organisations require environmental standards through the supply chain to both manage risks and secure natural infrastructure. The supply chain is expected to measure and manage their impacts on the natural environment, including biodiversity. Environmental reporting has to demonstrate improved biodiversity management.

Legal compliance

Legal protection of habitats and species is embodied in the 1979 Birds Directive, the 1992 Habitats Directive, and water management legislation, all of which focus on prevention of damage or destruction to animals and their habitats. There is little legislation to actually promote biodiversity, although public bodies have a 'biodiversity duty' and should pay regard to the Natural Environment and Rural

Communities (NERC) Act 2006. The Act encourages organisations to engage in the conservation of biodiversity, for example in the management of the land surrounding their offices, particularly ponds and hedgerows.

The benefits

What can businesses and organisations do with the Biodiversity Index?

- **Assess the biodiversity importance of a site** by surveying it during the growing season to identify existing habitats and plant life.

- **Improve the biodiversity value of a site** by creating site management plans incorporating the Biodiversity Index results, using it to identify habitats that can be protected, enhanced or created

- **Create a Biodiversity Action Plan** for the company or organisation detailing the aims, objectives, site management plan and external activities.

- **Involve staff:** Use notice boards and newsletters to raise awareness, identify a Biodiversity Champion, encourage team work and involvement with a biodiversity plan and promote participation in activities outside the office.

- **Improve biodiversity beyond the site:** Become corporate members of nature conservation bodies, get involved in local partnerships through funding and volunteering opportunities.

- **Undertake an environmental review** and synergise the site management plan with other business activities.

- **Monitor and report** on activities through a regular (annual) review of the Biodiversity Index, re-survey and update the management plan based on the results.

- **Communicate your actions** through publicising positive impacts on biodiversity using local media, partnership publications and engagement with stakeholders

The Biodiversity Index tool has been developed by The University of Northampton in conjunction with the Higher Education Funding Council for England (HEFCE), as part of the SEED sustainability project. The Biodiversity Index is available for use free-of-charge by schools, colleges and universities in the UK, with a chargeable version for the wider public and private sectors.

More information about the tool can be found at:
www.biodiversityindex.org

Jeff Ollerton
Professor of Biodiversity
University of Northampton EfmR

'Fixing the already broken': is it our efficiency approach?

Campaigns everywhere! On the media, corporate policies, even our friends and families keep reminding us to switch the lights off, or not to leave the PC or TV on, use public transport instead of cars, and finally, do not fly! Emphasis is the same: to change the personal behaviour. Feel the guilt of climate change, and become a good citizen. *Fix the already broken*.

How about if we stop concentrating on energy efficient buildings, but create buildings that use the most efficient energy?

All of us had our attempts to lessen the carbon impact by improving thermal efficiency of our single-glazed, charismatic Victorian buildings by insulating its roof and walls, or upgrading its boilers to more efficient ones. In other words, we were already been dragged to cope with our guilt, and admittedly, saved some in the process – but tried our own fix... In his book Energise!, Prof Woudhuysen claims that the answer is a bigger, better energy supply, not the public guilt.

From the facilities point of view, we need two things. Firstly, we need more energy efficient designs, and secondly low-carbon energy supplies, such as renewable energy sources.

At the end, it is not the buildings that create greenhouse gases, but the sources of energy... Whatever the facilities managers do thereafter to fix the 'building energy efficiency' can only be patchy, costly, sub-optimal, or temporary. If the buildings were to run with renewable energy, would we be as much concerned about making them greener as we do now?

But, realistically, is it possible to run buildings with renewable energy only? The answer, according to a research at Stanford University is yes. Two researchers came up with a feasible plan to meet the world's energy demand by 2030 from only wind, water and solar energy sources[1]. According to their calculations, based on availability of renewable resources, the number of devices needed and material requirements; to produce world's entire energy (electric power, transportation, heating/cooling, etc) by 2030, there are no technological or economic barriers, but social and political.

However, the world seems to be taking the right steps. In the latest Renewables 2012 Global Status Report, since 2008, worldwide investment in new renewable capacity has been doubled. Last year, in the European Union alone, renewables accounted for more than 71% of total electric capacity additions, bringing the renewables' share of total electric capacity to 31.1%[2]. Germany leads the way globally, with now 12.2% of the country's power, heating and transportation energy demand is addressed by renewable energy.

Interestingly, according to the same report, just last year, Germany's residential power from green markets has doubled in response to Fukushima events.

In the UK, renewables' portion to total energy sources is less than 5%, but there is a government target and a plan to increase this share to 15% by 2020. Investments in wind, water (especially tidal), and PV are contributing to this plan at a national level. In addition, public incentives such as Feed-in Tariff (FIT) gives people the right avenues to invest into green sources of energy.

The more a building's electricity, heating and cooling needs are met with renewable resources, the greener the buildings will be. Until then, it will leave facilities managers to fix a building's carbon problem by deploying *efficient* mechanical, electrical, or fabric solutions to the buildings they operate. Even worse, is the vast amount of investments flowing into intelligent building technologies to fix carbon issues generated by the energy source in the first place. Another patchy and temporary fix.

For now, I will leave renewable energy to policy makers, and perhaps time... On the 'energy efficient buildings' side, the greatest potential for savings and the most cost-effective strategies often start during the design stage. Some basic architectural features; such as insulation, orientation, overhangs and shadows, better building windows and envelope, effective window placing for daylighting, or even transport links can be all basic passive systems to make buildings greener before they get occupied. However, it is at the design and briefing stage that these highly cost-effective strategies are applied. If not done during the design stage, these will represent a significant opportunity loss that will be impossible to fix later on.

Consider a spectrum for buildings using efficient energy. On one side it will be the 'energy source' determining the efficiency of the energy going into the building, and on the other side is the design and construction efficiency of the building. Every other efficiency that would fall in between will be left for facilities managers to sort out. Namely, energy conservation behaviours and policy (eg switching off lights), or building modifications (eg installing an energy efficient chiller, or lighting dimmers) . Unfortunately, I am not aware of a research that demonstrates the relative contribution of these efficiencies in relation to their carbon reduction. We don't know, for instance, how much efficiencies could be achieved during the design stage by selecting the greener design features versus operational investment required later in the building life-cycle to counter-balance it via building modifications or change of behaviours.

Surely, evidence is needed to help decision makers prioritise which element in the spectrum should be paid attention first. In

How about creating buildings that use the most efficient energy?

the absence of it, that's why we tend to solve the problem from all aspects of the spectrum at once. But one can argue that most of this is self-evident and common sense.

When businesses invest in sustainable built environments, their executives naturally want to know how much they have saved and how long their savings will last. This requires accurate measurement for results of energy saving initiatives, a credible methodology for regular data maintenance, and finally business analytics to help decision making. If the installation had been made to reduce energy consumption, then substantiating information and critical measurements should be in place to determine a baseline against the benefits (savings, carbon reduction, etc).

At a building level, there are some studies available to confirm the value from green. For example LEED certified buildings can increase annual rental return by 4% - 6% and decrease on-going operational costs by as much as 13.6% .[3]

In my previous article here, I mentioned three emerging avenues for entrepreneurs that will significantly change the way we approach to do business on green. The first was to increase the productivity of natural resources; like energy, water, minerals, by reducing their wasteful use. The second was the shift to ecologically inspired production models where every output returns back to the ecosystem, or becomes part of the manufacturing process again. The third was a solution-based business model, such that rather than selling light bulbs, selling illumination services allowing for lower service margins.

Entwined with these business models applied during a building's life cycle is the efficient energy, and design elements mentioned here. It seems we have technologies, and with time we will have more of the renewable sources to run buildings greener. Most wanted, and if we ever become serious about green credentials, is to create buildings that use efficient energy, not try to fix them to become energy efficient thereafter.

Sezgin Kaya EfmR

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1   Jacobson, M & Delucchi, M (2011) Providing all global energy with wind, water and solar power.. Energy Policy, 39/3 pp.1154-1169.

2   Renewables 2012 Global Status Report, available at [http://www.map.ren21.net/GSR/GSR2012.pdf].

3   McGraw-Hill Construction's 2009 Green Outlook.

Understanding data to drive behaviour change

The UK government aims for all public and private sector organisations to have smart or advanced meters by 2020. In themselves, these meters do not save any energy – they merely provide data and information to the end user and rely on action being taken.

Advanced meters have been installed in larger organisations for a number of years to provide half hour energy data. This process was accelerated with the introduction of the CRC Energy Efficiency Scheme in 2010, whereby additional credits were awarded for organisations who installed advanced meters (AMR) across their portfolio.

Access to energy data for these larger businesses is focused towards the total energy consumed in the building, with accurate half hour profiles being made available. Data broken down at a lower level, such as for tenants or for major energy users requires sub-metering as a voluntary measure. Baseload energy consumption cannot be broken down any further in a simplistic manner to better understand its constituent components and thereby target reductions.

Scale of the business is a factor here – larger businesses have been compelled to install AMRs and may also have building management systems (BMS) to monitor energy use. Smaller and residential based businesses have direct control of their energy use and can be effectively managed through the smart meter roll-out. There is a gap in the middle of small and medium organisations who are too small for an effective BMS and too large for the standard smart meter. It is in this space that government and also industry has turned its attention with a number of new products coming onto the market.

What are smart and advanced meters?

Advanced Metering

■ Licence conditions from 6th April 2009 for the supply of gas and electricity

■ Applies to medium and larger business only

■ Large businesses have until 2014 and smaller businesses 2019 to comply

■ May not require the existing meter to be changed

■ Does not include remote disconnection function

■ Does not require in-home display

■ Interoperability uncertain

Smart Meter Roll-Out

■ Applies to roll-out for all gas and electricity meters

■ Applies to residential and small and medium business (2 million organisations).

■ Generally must include a remote disconnection capability

■ Generally requires in-home display

■ Interoperability more certain

Does metering energy help businesses?

The main benefit of the smart and advanced meters is to remove estimated bills and give customers better information to manage their energy consumption, which will happen as a minimum. Data at an anonymised level is critical – at present the UK government has little understanding of how energy gets consumed by the millions of residential and commercial developments. There is an understanding of the total energy used and where large chunks go for major manufacturers, but at a lower level energy consumption is unknown. Installation of the meters will help to bridge the gap and enable better management of the energy grid and supply to consumers. In itself, such knowledge should help to reduce costs by the grid and network operators.

The diagram below highlights the potential benefits that are anticipated from the smart meter roll-out and introduction of advanced meters for larger business. Implicit with the benefits, and particularly the cost savings is the action taken by individuals and business to reduce energy consumption and engage more in the energy market to drive costs down.

The potential savings, estimated by the government at 2.8% reduction for electricity and 4.5% for gas are conservative. Carbon Trust research estimates the benefits at over 10% savings are achievable through better use of the data.

See fig 1, overleaf

However, the evidence available from previous trials with businesses has shown an initial rapid improvement in energy efficiency as the new data is used – similar to the householder looking at the meter and turning equipment on and off to see how much energy is consumed. This initial euphoria is followed by a slow decline as energy usage levels creep back, resulting in a small net improvement after 12 months, typically in the region of 2% benefit. Purchasing of additional energy consuming items is not factored into this equation, such as the plethora of smartphones, laptop and tablet computers and similar devices, meaning total energy use may be little different to where it was 12 months previously.
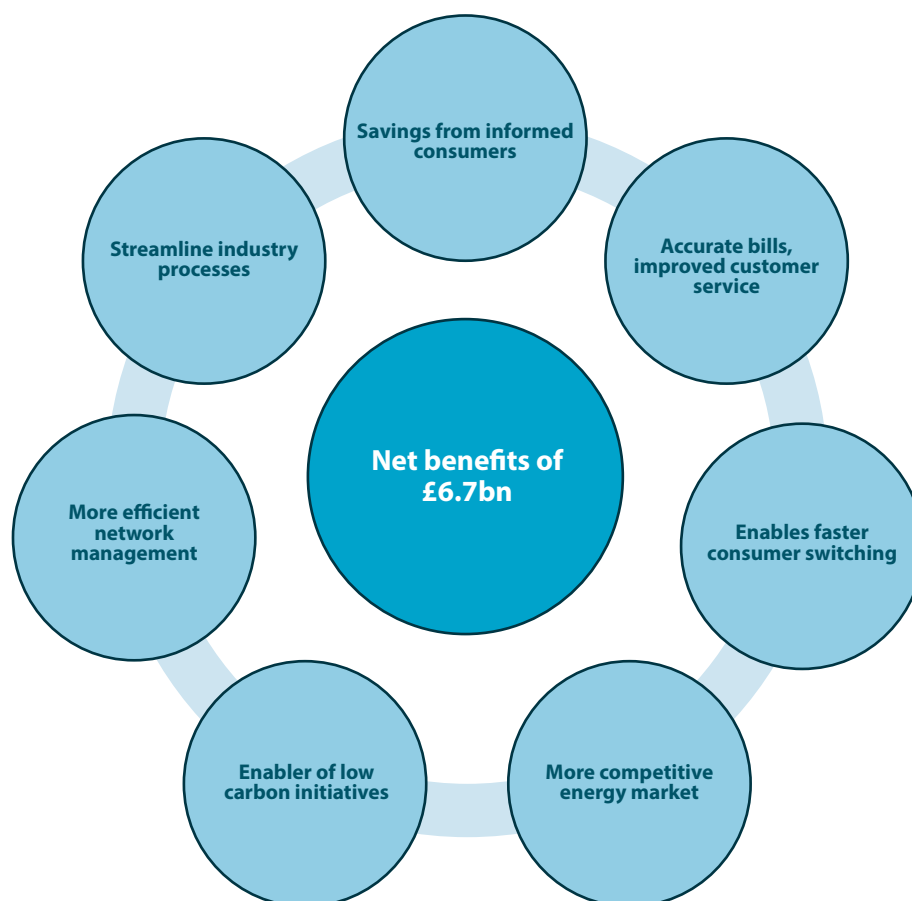
Figure 1

How can energy savings be achieved?

You may be wondering what's the point of metering for energy.

It all comes down to how we capture the energy data – now provided in a more robust way – and visualise it to understand where savings can be made. At present, much of the information is provided through energy profiles as visual dashboards or graphics that rely on the reader to understand the profile and where any issues may occur. Exception reporting outside of parameters is common providing a safety-net where a failure has occurred, but this does not deal with the day to day over use of energy being targeted by energy efficiency programmes.

Personal experience with training organisations and individuals over the past decade has shown a significant gap in the level of knowledge, understanding and confidence of the site FM team to read and interpret the visual profiles.

Competency at this level is critical to understand where saving opportunities exists – and this is where a significant amount of innovation is taking place within the sector based upon the use of algorithms or extensive data analysis. The potential is that within the next 12 months, energy data can be analysed by a third party in real time to assess where efficiencies can be made, highlighting the top areas for further detailed investigation. The impact on FM of this move could be huge – it will remove the necessity for building managers to be able to fully understand the energy profiles and what this means for their business; and removes the conflicts that regularly appear between the maintenance contractor and site FM. Instead, it enables the site FM to take on the role of being customer facing, utilising the data and insights to highlight where savings and efficiencies can be made, and working with the maintenance team to deliver on those savings.

This set of insights can be provided at an FM level, within the control and management of the FM team directly, at a building level with engagement of staff, or a corporate level to share knowledge and experiences across the business.

Engaging the customer

We have moved from data, through the visualisation of that data into the provision of insights – a key list of actions to be taken. Commonly, it is this step that is missed out when engaging with the end user, who has control over almost 70% of the energy used in the building.

Historic approaches to engaging with staff have been based upon logic – that staff, and people in general, respond to logic. Provide a robust argument about the benefits and people will follow – simple as that. Unfortunately, people do not follow logic, and groups of people as staff invariably will be, can exhibit very different behaviours.

Campaigns on energy efficiency are the most common approach to engage staff – a short programme with a roadshow, events, stickers and posters will lead to a dramatic reduction in energy use over the campaign timeframe and perhaps for a few weeks after. Looking forward a month, energy use is broadly where it was. Which asks the question – what was the benefit of the exercise?

A key factor is the inability to connect the savings generated by staff, and particular members, with tangible and accurate data. As such, savings can only be taken as a collective and compared to the total consumption of a building, taking into account the multiple changes that result in variance of energy consumption. It may be that significant savings have been continued to be made by staff – but

that other factors have led to an increase of a few percent energy. Without being able to unpick these factors, we are at a loss to clearly and simply measure the benefits that staff bring, which brings us back to the issues faced by larger business installing AMRs.

A new generation of meters, able to measure small power, may be the answer to resolving this conundrum. By understanding the proportions of small power in the context of the other energy uses in a building, FM can have a more accurate dialogue with staff and also senior management, on not only how best to engage but also who they should target, to achieve energy savings.

Smart meter project outline

EIC and Acclaro Advisory are undertaking a study to understand the commercial and public sector requirements for data and information, including how the knowledge is provided, to affect behaviour change.

There is a gap regarding how successful behaviour change, from robust information, can maintain the benefits to both government and the end user. This piece of research has been proposed to help understand the following aspects, specifically for the public and private sector commercial estate:

- What is the general understanding of smart metering requirements and regulations?

- What level of information and detail do customers require to affect long-term behavioral change?

- How should/will the data be portrayed (ie the customer interface)?

- What tools and approaches will be used in conjunction with the collated data to help reduce energy consumption?

- How can/will behaviour change be maintained and embedded over the long-term?

Sunil Shah EfmR

Product study: Pharmafilter

The concept

Energy is recovered, the quantity of waste is considerably reduced and the wastewater is converted into process water without any trace of micro-pollutants. The benefits for patient and nursing staff are improvement of hygiene and efficiency of hospital processes by using single-use disposables as bedpans resulting in a positive financial case and less cross contamination in the hospital by reducing the number of contact moments between staff and contaminated waste.

The concept was tested in 2008 as a proof-of-principle for the wastewater treatment and digestion component of the total Pharmafilter concept. The digestion of amongst others bioplastics under thermophilic conditions was possible and also analysis of the water phase showed complete removal of all tested micro-pollutants. On basis of these tests a full-scale installation has been built which is since 2010 operational in Delft.

Pharmafilter represents a change in the way we work that positively enhances the work environment, patient safety and care. It is an environmentally friendly way of dealing with the complex waste, sewage and wastewater streams emanating from hospitals. It is a thoroughly integrated waste management system that at every interface delivers significant improvement in the handling, removal and treatment of waste streams arising in hospital.

Logistically and historically, waste in hospitals is removed and separated into various categories. This activity requires both significant staffing hours, physical infrastructure and recording of waste types. This process requires the use of sorting rooms, internal, external storage and transporting waste through public corridors and lifts.

The process

Starting with the Tonto high tech shredding units that are installed in service or utility rooms convenient to areas of waste output. The Tonto processes all waste generated in the department and ward from healthcare risk waste, food, sharps, materials contaminated with blood, soiled, pharmaceuticals, paper, plastics, biodegradable bedpans and urine collection units.

Waste no longer leaves the hospital through corridors and lifts therefore reducing the exposure to and risk posed by hazardous waste to patients, staff and visitors. The Tonto grinds these waste materials to a particulate size so they can be easily accommodated and transported by the hospitals existing sewer network.

We are now at a point where the hospital waste has exited the building and the Pharmafilter on site plant picks up the external sewer and automatically decontaminates and separates all constituents of this mixed waste stream; sewage, organics and water.

The treatment process engages several patented technology processes resulting in outputs free of viruses, pathogens harmful bacteria, pharmaceuticals and other trace contaminants. In exploiting this technology, the user has reduced their staff and patients exposure to hazardous waste and the time, effort and cost involved in its treatment. The system treatment sets a new standard environmentally and in terms of its efficiency. The on site plant produces its own electricity, notably it produces water of a quality that can be reused in the hospital. It reduces mixed waste (including hazardous) by 50% of volume including 90% of organic waste representing another cost benefit.

Hospital waste water treatment description

The waste water from hospitals contains high concentrations of pharmaceuticals, such as antibiotics, painkillers, cyto-toxic substances, heart medicines and contrast media. Through urine and faeces these substances are discharged to the waste water system and despite excellent biological treatment in waste water treatment plants, eventually discharged into surface water. It is suggested that these toxic and carcinogenic kinds of compounds are responsible for disrupting water life and cause disease and malformation in water organisms by their hormone disrupting activity among others. At this moment these kinds of substances are the emerging substances in environmental policy.

Characterisation of hospital waste water

Hospitals can be seen as a 'hot-spot' of pharmaceutical emission because here there is a high load of pharmaceuticals used and emitted through hospital wastewater into the municipal sewerage.

It has been well established that sewage treatment plants and more globally, all water compartments (effluent to river) are reservoirs of antibiotics resistant bacteria where horizontal transfer shapes the future evolution of resistance determinants (Szczepanowski et al 2009; Moura et al 2007; Martinez 2009, Zhang, et al 2009).

As a consequence, the emergence of antibiotic resistant genes (ARGs) in the water environment is becoming of increasing worldwide concern. Hundreds of various ARGs encoding resistance to a broad range of antibiotics have been found in microorganisms, distributed in surface water, groundwater, hospital wastewaters, in sewage, waste water treatment plants, and even in drinking water and bottled water (Barraud & M-C Ploy 2011a; Falcone-Dias et al 2012). Source Pills Report 2012.

Waste stream handling and protocols

The handling of food waste and general waste processing in hospitals requires a lot of time and space. In preparation of food, cleaning and washing has severe logistical challenges and disadvantages. It takes a lot of time and space (kitchen, transportation, lifts, washing kitchen). The handling of bedpans is also time consuming because every bedpan has to be washed and disinfected. There is also a severe risk of cross contamination during this handling process. Pharmafilter is a system in which all waste and wastewater streams in hospitals are combined. The waste water flow includes the solid waste in the form of bio plastic bedpans, urinals, kitchen refuse, general waste, and healthcare risk waste is also processed. Optimisation of handling and hygiene in the hospital is encountered by the use of bio plastics for bedpans, urinals and other single use disposables. All solid waste is processed by a Tonto shredder; the small particles from this shredder are flushed through the existing sewer system to the Pharmafilter onsite central liquid / solid separation unit. The solid fraction is fed into a Pharmafilter digester tank, digested and fully decontaminated. This process produces biogas, which is reused to power the plant. The on-site Pharmafilter plant completely removes the medicines and endocrine disruptors in the waste water treatment phase.

Waste

The above process and treatment results in the decontamination and significant reductions in the volume and waste type emanating from hospitals, therefore delivering a vast reduction in road movements of waste trucks and costs of removal for transportation and processing. Digestate from the digester is disinfected by the thermophilic (high temperature) conditions in the digester and an extra disinfection step is introduced to the dewatered sludge so it can be used (proven technology) beneficially.

Waste water

The water streams from the hospital sewers and digester are treated in the on-site Pharmafilter plant engaging a new patented design. The biologic treatment is for extra removal of nitrogen and phosphorus. The water from this high tech waste water treatment plant is crystal clear, disinfected and with very low nitrogen and phosphorus content can be discharged to sewer. The wastewater is now free of the previously high concentrations of pharmaceuticals, such as antibiotics, painkillers and heart medicines. The water is now ready to be reused for the flushing of the Tonto shredded, toilets and other beneficial applications such as boiler feed or garden water.

Independent source

The effluent from the hospital is fully purified in four steps and cleansed of all harmful substances such as medicinal residues, cytostatics, contrast liquids, endocrine substances, bacteria and viruses. Samples show that all medicinal residues found in the waste water are eliminated to below the detection limit.

Medicinal waste in the water is no longer detectable. 99.9% savings on the waste water charge.

The purified water is suitable for flushing the Tonto, toilets, cooling towers and other process applications.

Up to 70 % reuse of water is achievable.

Pharmafilter is now available in the UK as we have now partnered with Enviorpharm in Wales to represent us in the market.

Peter Kelly, International Dorector, Pharmafilter BV EfmR

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BIFM Training Calendar

Please see an updated programme below for Nov-Dec 2013. For more details please visit www.bifm-training. com. Please note the BIFM Training programme is managed by Quadrilect Ltd.

November

5-6	Display Screen Regulations and Risk Assessments - accredited by the Institute of Ergonomics & Human Factors (IEHF)	Central London
5-7	Team Leading - ILM Level 2 Award in Leadership & Team Skills	Central London
5	Introduction to Catering Contracts	Central London
5-7	Making Catering Contracts Work	Central London
7	Cutting Costs but Maintaining Services	Central London
12-14	Understanding FM [Foundation]	Central London
12	Building Surveying & Maintenance	Central London
13-14	Understanding & Managing Building Services	Central London
18	Exploring Innovation in FM (BIFM Executive Programme)	Central London
19-21	FM Business School [Advanced]	Central London
19	A-Z of FM Compliance and Standards	Central London
19	Building Information Modelling (BIM) & Soft Landings - NEW	Central London
20	Making the Change to Agile Working	Central London
20-21	Health & Safety Regulations, Responsibilities & Risk Assessment	Central London
26-28	The Professional FM 1 [Intermediate]	Central London
27	FM Governance and Risk (BIFM Executive Programme)	Central London
26-27	Fire Safety Law & Risk Assessment	Central London
28	IOSH Safety for Senior Executives	Central London

October

3	Advancing Sustainability	Central London
3-5	The Professional FM 2 [Intermediate]	Central London
4	Financial Management 1	Central London
4-5	Property Management	Central London
5	Financial Management 2	Central London
5	Legionella Awareness, Responsibilities and Compliance - NEW	Central London
10-12	Understanding FM	Central London
10	The Tender Process	Central London
11	Contract Management	Central London
11	BS11000 Collaborative Business Relationships - NEW	Central London
12	Negotiating to Win	Central London
12	Managing FM Performance	Central London

Infobank

Commissioning Editor

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Martijn Groen, MSc (Facility and Environment Management), is an FM Consultant for Bernard Williams Associates. BWA's FM Division provides experienced and comprehensive FM consultancy services to enable clients to optimise premises and facilities performance to benefit the organisation as a whole.
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The Biodiversity Index tool has been developed by The University of Northampton in conjunction with the Higher Education Funding Council for England (HEFCE), as part of the SEED sustainability project. The Biodiversity Index is available for use free-of-charge by schools, colleges and universities in the UK, with a chargeable version for the wider public and private sectors.

More information about the tool can be found at:
www.biodiversityindex.org

Professor Jeff Ollerton is a Professor of Biodiversity at the University of Northampton (academic School of Science and Technology) and was a key figure in the initiation and development of the Biodiversity Index.

Sezgin Kaya
Sezgin Kaya has built up his expertise and academic background in international facilities management markets, strategic facilities management, asset management service delivery models, facilities systems, benchmarks, and performance management. He is currently working at Procurian as the EMEA Practice Lead for procuring cross-border facilities and corporate real estate contracts, standardisation and technology processes for international organisations. Sezgin can be contacted at Procurian – 07789 633 632.

Sunil Shah
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Peter Kelly
Peter Kelly (International Director Pharmafilter BV) has fifteen experience year's commercial and technical experience in Bio Plastics. He is a specialist in the use of biodegradable plastic for marine wetlands and rivers in conjunction with denitrification of wastewater for aquaculture, rejuvenation sea grass and erosion control applications. He is also an expert in the area of bio plastics in anaerobic digestion and sewage treatment.

Peter is responsible for Pharmafilter global commercial roll out in the healthcare sector. He is also the head of Pharmafilter bio plastics and biobased chemicals platform. He is focused on the use of second generation feed stock from Waste and Wastewater via the conversion of nutrients through to the recovery of monomers and compounding of bio polymers that are used in the production of Pharmafilter single use products.